



DICER1 gene

dicer 1, ribonuclease III

Normal Function

The *DICER1* gene provides instructions for making a protein that plays a role in regulating the activity (expression) of other genes. The Dicer protein aids in the production of a molecule called microRNA (miRNA). MicroRNAs are short lengths of RNA, a chemical cousin of DNA. Dicer cuts (cleaves) precursor RNA molecules to produce miRNA.

MicroRNAs control gene expression by blocking the process of protein production. In the first step of making a protein from a gene, another type of RNA called messenger RNA (mRNA) is formed and acts as the blueprint for protein production. MicroRNAs attach to specific mRNA molecules and stop the process by which protein is made. Sometimes, miRNAs break down the mRNA, which also blocks protein production. Through this role in regulating the expression of genes, Dicer is involved in many processes, including cell growth and division (proliferation) and the maturation of cells to take on specialized functions (differentiation).

Health Conditions Related to Genetic Changes

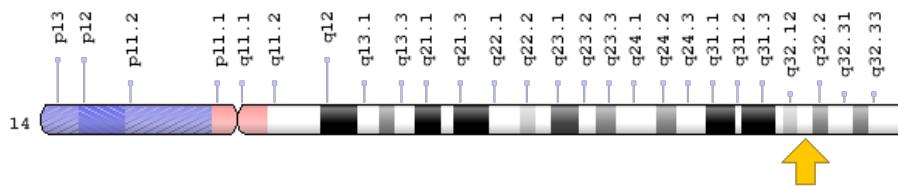
DICER1 syndrome

Mutations in the *DICER1* gene cause *DICER1* syndrome. People with this condition have an increased risk of developing many types of tumors, particularly certain tumors of the lungs (pleuropulmonary blastoma); kidneys (cystic nephroma); ovaries (Sertoli-Leydig tumors); and thyroid, a butterfly-shaped gland in the lower neck (multinodular goiter). Most of these mutations lead to an abnormally short Dicer protein that is likely unable to produce miRNA. Without regulation by miRNA, genes are expressed abnormally, which could cause cells to grow and divide uncontrollably and lead to tumor formation.

Chromosomal Location

Cytogenetic Location: 14q32.13, which is the long (q) arm of chromosome 14 at position 32.13

Molecular Location: base pairs 95,086,228 to 95,158,010 on chromosome 14 (Homo sapiens Annotation Release 108, GRCh38.p7) (NCBI)



Credit: Genome Decoration Page/NCBI

Other Names for This Gene

- DCR1
- Dicer
- dicer 1 ribonuclease III
- dicer 1, double-stranded RNA-specific endoribonuclease
- dicer 1, ribonuclease type III
- Dicer1, Dcr-1 homolog
- DICER_HUMAN
- endoribonuclease Dicer
- helicase MOI
- helicase-moi
- helicase with RNase motif
- HERNA
- K12H4.8-LIKE
- KIAA0928
- MNG1

Additional Information & Resources

Educational Resources

- Stembook (2008): MicroRNA Biogenesis and Function
<https://www.ncbi.nlm.nih.gov/books/NBK27061/#theroleofmicrornasingermline.sec1-3>
- Stembook (2008): The Biogenesis of miRNAs and Related Small RNAs
<https://www.ncbi.nlm.nih.gov/books/NBK27046/#smallrnas.sec1-2>

GeneReviews

- DICER1-Related Disorders
<https://www.ncbi.nlm.nih.gov/books/NBK196157>

Scientific Articles on PubMed

- PubMed
<https://www.ncbi.nlm.nih.gov/pubmed?term=%28DICER1%5BTIAB%5D%29+AND+%28%28Genes%5BMH%5D%29+OR+%28Genetic+Phenomena%5BMH%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+720+days%22%5Bdp%5D>

OMIM

- DICER, DROSOPHILA, HOMOLOG OF, 1
<http://omim.org/entry/606241>

Research Resources

- Atlas of Genetics and Cytogenetics in Oncology and Haematology
http://atlasgeneticsoncology.org/Genes/GC_DICER1.html
- ClinVar
<https://www.ncbi.nlm.nih.gov/clinvar?term=DICER1%5Bgene%5D>
- HGNC Gene Family: RNA helicases
<http://www.genenames.org/cgi-bin/genefamilies/set/1168>
- HGNC Gene Symbol Report
http://www.genenames.org/cgi-bin/gene_symbol_report?q=data/hgnc_data.php&hgnc_id=17098
- NCBI Gene
<https://www.ncbi.nlm.nih.gov/gene/23405>
- UniProt
<http://www.uniprot.org/uniprot/Q9UPY3>

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